

TRENDS IN
TELECOMMUNICATION
REFORM
2013
TRANSNATIONAL
ASPECTS
OF REGULATION
IN A NETWORKED
SOCIETY

SUMMARY



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INTRODUCTION

The Telecommunication Development Bureau (BDT) of the International Telecommunication Union (ITU) is pleased to present the thirteenth edition of *Trends in Telecommunication Reform*. The *Trends* report is an integral component of the on-going dialogue between ITU/BDT and the world's ICT regulators. This year's theme – “Transnational aspects of Regulation in a Networked Society,” was the subject of the discussions at the most recent Global Symposium for Regulators (GSR), held in October 2012 in Colombo, Sri Lanka.

This year's *Trends* Report contains eight chapters that explore the legal and regulatory issues that are emerging as advanced networks spread throughout the world, and new services and applications increasingly cross borders:

- Chapter 1 identifies the key trends in the ICT market and the regulatory trends emerging in our networked society.
- Chapter 2 discusses the issues associated with net neutrality; providing an overview of traffic management measures, the factors driving their use and the regulatory approaches countries have taken.
- Chapter 3 assesses spectrum policy in an era of increasing scarcity; discusses the high-level principles that underlie effective policy-making and identifies best practices.
- Chapter 4 reviews the policy issues associated with the cost of international mobile roaming, and examines the technological, business and regulatory initiatives that have been undertaken to bring such costs down.
- Chapter 5 reviews the current state of the interconnection market, and the challenges faced by policy-makers seeking to balance policy goals with the creativity, efficiency, and openness that has allowed Internet to thrive.
- Chapter 6 considers cloud computing from a technical, market and social perspective, and examines the legal implications of cloud services, the role of regulation and how policy-makers can create an environment conducive to the take-up of cloud services that address user concerns.
- Chapter 7 considers the definition of cloud services; current privacy and data protection regulation as applied to cloud services; the effectiveness of current regulation and enforcement to preserve privacy; and a regulatory approach that seeks to balance commercial needs with users' reasonable expectation of privacy in a cloud environment.
- Chapter 8 provides the overall conclusions of this Report.

1 ICT MARKET AND REGULATORY TRENDS

The ICT industry remains one of the most vibrant and dynamic global markets; as more and more people are getting connected, new applications and services are being developed and users' online experiences are expanding throughout the world. Living in a networked society certainly brings a host of exciting prospects, but also raises questions about how new technologies and services can best be used to achieve society's goals. In this increasingly digital environment, some key questions need to be addressed to assess the readiness of countries' legal and regulatory frameworks and assist policy-makers and regulators in pushing forward their national digital agendas within the context of a globalized, connected world.

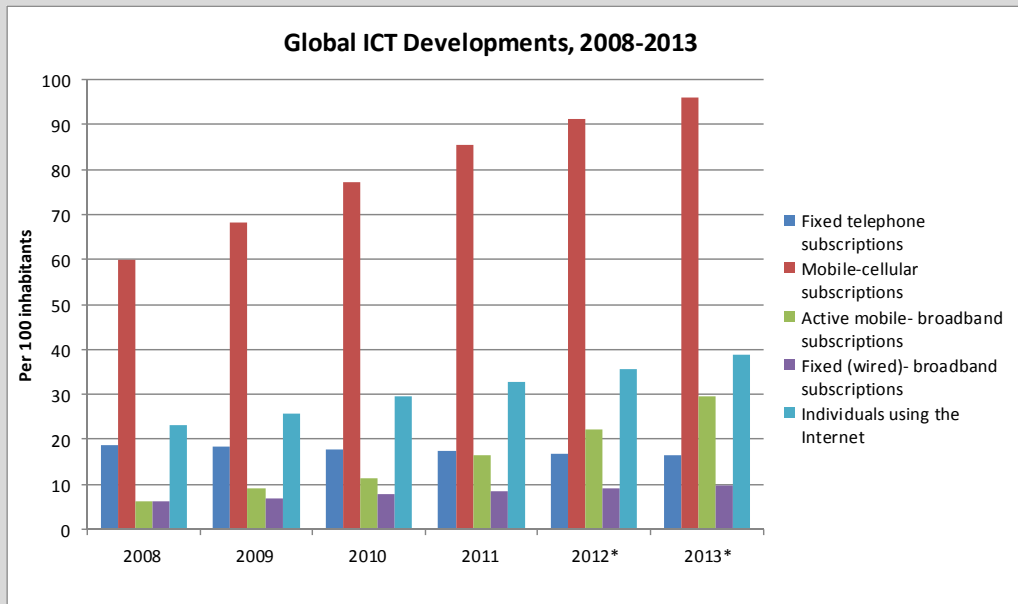
1.1.1 Growth of the ICT Market

The rapid growth of the ICT market has important implications for both users and businesses. For users—both individuals and businesses—there is an ever-expanding variety of services and applications to serve their information, communication and entertainment needs. As a result, the ways consumers access and use such services is changing; moving from reliance on traditional media to Internet broadband services.

Looking at the big picture, ITU estimates that by end of 2013, the number of fixed-broadband subscriptions will have climbed to more than 688 million, corresponding to a global penetration rate of 9.8 per cent. At the same time, the number of active mobile-broadband subscriptions will grow by 21 per cent between 2010 and 2013, to an estimated 2.1 billion by end of 2013; representing nearly three times the number of fixed-broadband subscriptions, but still much fewer than mobile cellular subscriptions, which will reach an estimated 6.84 billion by end of 2013¹ (see Figure 1.1).

ITU estimates show that mobile broadband penetration in the developing world will reach 20 per cent while penetration levels in the developed world will represent 75 per cent by end 2013.

Total global Internet users will reach an estimated 2.7 billion worldwide by end of 2013. In developing countries, the number of Internet users will have more than tripled between 2007 and 2013, to reach more than 1.8 billion. Despite this rapid growth, however, less than a third of inhabitants in the developing world will be online by end of 2013.

Figure 1.1 Global ICT trends and broadband penetration, 2008-2013

*Note: *2012 and 2013 data are based on estimates.*

Source: ITU World Telecommunication/ICT Indicators database.

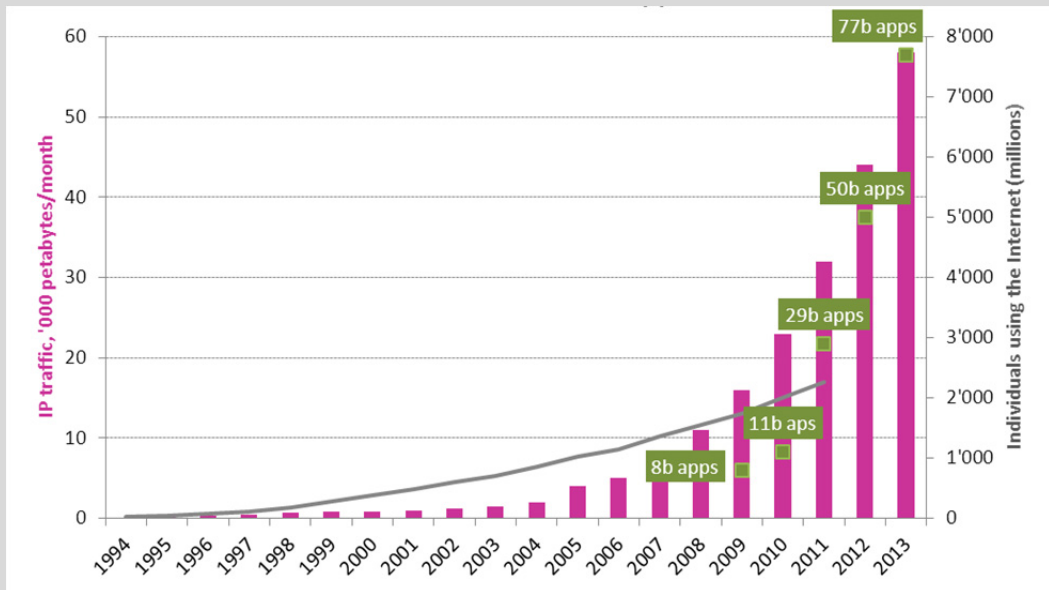
Triggered by the growing number of Internet connections over mobile and fixed platforms, monthly Internet protocol (IP) traffic has skyrocketed from the modest 1 petabyte two decades ago, to an estimated 44'000 petabytes in 2012¹. And the sky does not seem to be the limit for future IP traffic growth; in 2013, IP traffic is expected to grow by some 14'000 petabytes/month, the equivalent of twice the global cumulated traffic over the whole decade from 1994 to 2003.² These tremendous volumes are driven by growth in the number of connected people and devices, and the growing availability of abundant, diversified, and in most cases free, online content (see Figure 1.2 below). In 2012, the number of individuals using the Internet reached the milestone of 2.7 billion people³ and the total number of applications downloaded over all types of mobile devices is estimated to have surpassed 50 billion⁴ (see Figure1. 2 below).

1 Telegeography 2012

2 According to Telegeography data.

3 ITU World Telecommunications/ICT Indicators Database, www.itu.int/icteye

4 ABI Research 2012.

Figure 1.2: Growth in IP traffic, Internet users and apps downloads (1994-2013)

Source: ITU, based on data from ITU, Cisco VNI, Andrew Odlyzko, RHK, Telegeography, IDC, ABI Research, and Chetan Sharma Consulting.

Note: 1) "b" equals billion. 2) Numbers for IP traffic and application downloads for 2010 and later as well as 2013 numbers on individuals using the Internet are estimates.

As in recent years, data still generates over 90 percent of consumer traffic, through video streaming, file sharing or online gaming (see Figure 3, left chart). Online gaming and video calling, boosted by new mobile devices providing a richer user experience, are the rising stars in IP traffic growth, with over 40 percent year-on-year increase from 2010-2015⁵. File sharing has also been experiencing dynamic growth, despite recent issues with major OTTs such as Megaupload.

The confirmed trend towards the use and ownership of multiple connected devices is here to stay, in both developed and developing countries. The face of the digital divide is also changing; from separating those who have a screen from those who do not, to digital haves and have-nots of multiple screens—in particular of broadband-enabled devices (such as smartphones, laptops, tablets, PCs and dongles). While those with access to a single device may benefit, at least to some extent, from the ubiquity of broadband networks, only those having multiple devices connected to the Internet can fully realize the promise of the hyper-connected world.

⁵

According to Cisco VNI 2012.

1.2 Adapting to change in a competitive environment

Over the past two decades, most markets have achieved some level of regulatory maturity, many with an established, separate regulator, competitive framework and privatized incumbent. While the number of regulators continues to grow slowly but surely, privatizations have slowed considerably over the past five years, likely due to the global financial crisis and the new dynamics of the ICT sector, which generally now provide multiple opportunities for market entry through simplified licensing regimes. The development of competition is progressing healthily in all market segments, with broadband markets competitive, at least legally, in a vast majority of countries.

In such an era of transition, policy-makers and regulators need to consider carefully whether their legal and regulatory frameworks will be able to effectively address the changing ICT landscape and ensure non-discriminatory practices and transparency of information from network and service providers. As the character of the services carried over broadband networks becomes genuinely transnational, strengthening cross-border, regional and international cooperation will remain key to ensuring that all citizens of the world can benefit from affordable, secure and safe access anytime and anywhere.

1.2.1 Regulatory challenges

Choosing and adopting appropriate regulatory tools to respond to new market behaviours and the growing need for consumer protection is increasingly complex for regulators in today's converged environment.

As regulators consider these various difficult issues, they need to be mindful of the international context within which they operate. The rise of the mobile sector has forced a search for new spectrum—a search that begins with international allocations and is realized in the development of regional band plans that guide spectrum use (see Chapter 3). On the fixed network side, policymakers and regulators are grappling with how to improve access to the Internet's resources—to increase transnational connections to services and reduce costs; and how to ensure that traffic is managed in a fair and effective way that balances the needs of consumers, network operators and content/service providers (see Chapters 2 and 5). With respect to consumer protection, policy-makers and regulators are increasingly called upon to address multiple issues, such as securing privacy and data protection in a cloud environment, and raising user awareness on the appropriate use and impact of shared content, as further described in Chapter 7.

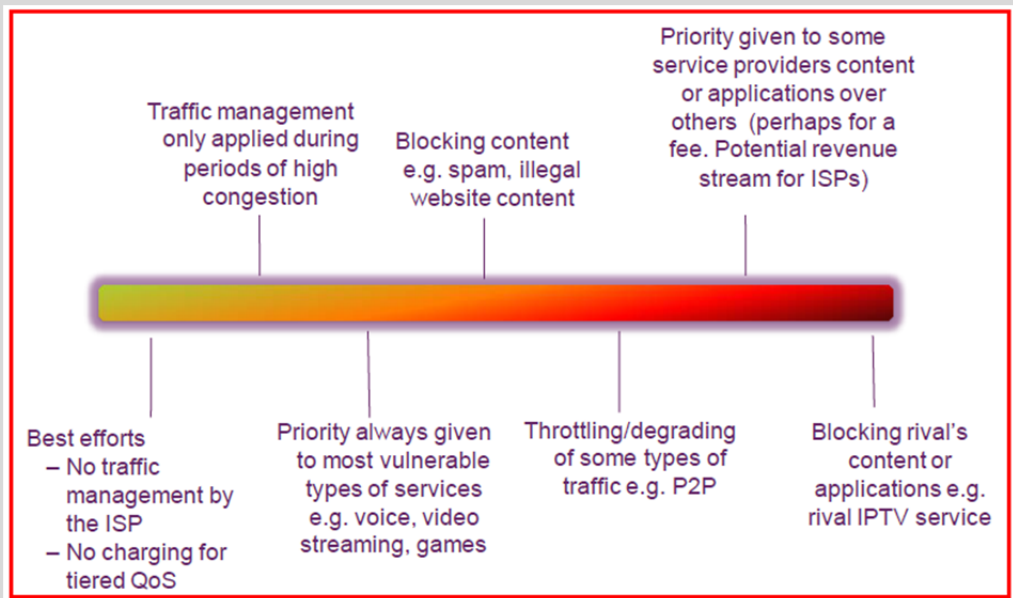
2 NET NEUTRALITY: A REGULATORY PERSPECTIVE

Net neutrality can be broadly described as the principle that all electronic communications passing through a network should be treated equally. In practice, however, “net neutrality” is a somewhat vague concept, and there is no single, commonly accepted definition of the term.

Issue surrounding net neutrality have arisen because of concerns that broadband access providers may discriminate against certain services, applications or content (and/or the companies that provide them), particularly where those services may compete against the carriers own offerings. Proponents of strong net neutrality protections argue that companies have an incentive to engage in discriminatory behaviour, particularly if competition is not sufficient to prevent discriminatory practices or if content and application providers do not have sufficient size to negotiate with the access providers. Opponents of net neutrality regulations often argue that such provisions are a “solution in search of a problem;” that there is no evidence of widespread abuse. They also argue that the market (perhaps enhanced by more effective competition policies) will naturally constrain bad behaviour, that access providers ability to manage traffic is critical to running a network efficiently and that net neutrality provisions may actually reduce access providers’ ability to offer innovative packages of services.

Internet service providers (ISPs) manage traffic on their networks for a variety of legitimate reasons, including to prevent congestion and ensure network security. To do this, they employ a range of tools and practices such as data caps, congestion management algorithms, prioritization, differential throttling and access tiering, and simply blocking specific types of traffic. Concerns arise because these same tools can also be used to thwart competing services and providers. In particular, the use of traffic management by an operator for anti-competitive purposes by using its control over Internet access (e.g., to discriminate against any competitors that rely on its network) has been the subject of greatest concern. As critics point out, that there is a fine line between correctly applying traffic management to ensure a high quality of service and wrongly interfering with Internet traffic to limit applications that threaten the ISP’s own lines of business. Some mobile operators, for example, have tried to block Skype or other VoIP applications, seeing a threat to their revenue.

Thus, one of the key questions in the net neutrality debate concerns what types of traffic management are acceptable (and what triggers their use) and which are not. Ofcom, for example, has placed management practices on a spectrum, which shows the progression from traffic management that does not raise concerns (and will generally improve efficiency), to those measures considered more problematic (see Figure 2.1 **Error! Reference source not found.**).

Figure 2. 1: Traffic management conduct

Source: Ofcom, United Kingdom, available online at: stakeholders.ofcom.org.uk/binaries/consultations/net-neutrality/summary/netneutrality.pdf.

There are a number of issues that policy-makers must consider when developing a regulatory regime to govern net neutrality. These issues are examined in details in this Chapter and recommendations are also proposed.

In many ways, the net neutrality debate will continue to be shaped by the changing dynamics of the ICT market. Fixed line and mobile operators facing increasing capital investment costs will continue to seek more equitable business and revenue sharing models. In turn, service providers are responding by taking measures to protect their own interests, such as reducing reliance on public networks by using Content Delivery Networks (CDNs) or by building or acquiring their own networks. Going forward, both regulatory and business models will need to adjust to ensure that investment in advanced networks and services is encouraged. There is ongoing debate on the appropriate regulatory model for access, with proponents of net neutrality regulation calling for greater investment in and upgrades to both access and backhaul networks. Likewise, new business models are being suggested to deal with the investment needed to serve new bandwidth-hungry content and applications. These include charging service providers more for prioritization (faster or higher quality service for latency-sensitive services) and providing guaranteed network capacity and quality of service for end users.

3 SPECTRUM POLICY IN A HYPERCONNECTED DIGITAL MOBILE WORLD

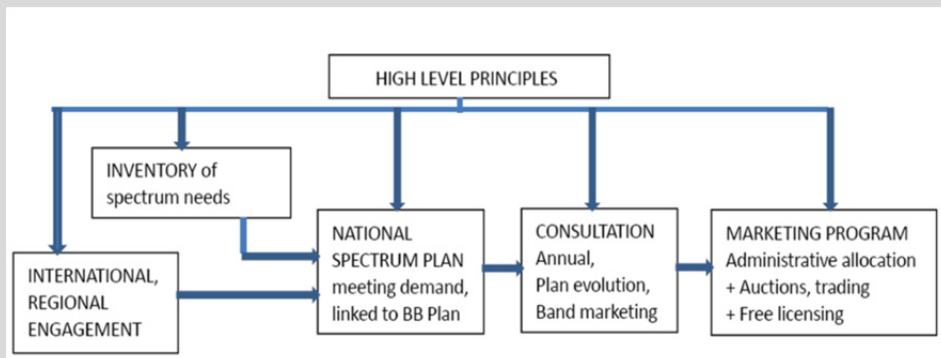
One of the brightest successes in the ICT world over the past five or more years has been the growth of mobile broadband services. Demand for new broadband applications and services, in combination with the arrival of smart phones and tablets, have created the beginnings of a seismic shift in industry structure and relationships. For example, converged services, emerging machine-to-machine (m2m) communications, cloud services, and “over-the-top” services (e.g., VoIP) are giving rise to a new breed of service provider. Many of these new services and providers are in their infancy, but the evidence of greater things to come is overwhelming. Cisco, for example, predicts that global mobile data traffic will grow 18-fold from 2011 to 2016 with a compound growth rate of 78 per cent, a rate that is three times faster than fixed broadband traffic.⁶ Thus, one of the most pressing issues for spectrum regulators is how to sustain this growth.

As a result of these new technologies and services, traditional business models and concepts of regulation are now being challenged. In this context, policy-makers and regulators face significant challenges in managing spectrum most effectively, and ensuring that the radio frequency resource is used most efficiently. Such efforts are especially relevant to developing countries, where wireless is likely to be the primary vehicle for broadband service delivery.

To address such issues, a new model for spectrum regulation is coming into practice. In step with evolving regulatory approaches in telecommunications as a whole, the strategy of dealing with the allocation and assignment of spectrum has also matured through three phases during the last two decades, culminating in the emergence of “Third Generation Regulation,” which is focused on the evaluation of alternative uses of spectrum, re-use, re-farming, liberalization and a renewed scrutiny of the efficiency of current spectrum uses. In this third generation, administrative methods are increasingly being replaced by market approaches that seek to apply economic criteria for achieving the highest-valued use of the spectrum where appropriate.

In order to effectively manage spectrum, and ensure that developing needs can be met into the future, many countries are creating a national spectrum policy, either as part of their overall ICT/broadband planning or separately. The best practices identified above provide a starting point for the development and implementation of a national spectrum policy. The essential elements in developing an effective plan are summarized in 3.1.

⁶ Cisco : VNI Mobile Forecast Highlights, 2011 – 2016, available at: –
www.cisco.com/web/solutions/sp/vni/vni_mobile_forecast_highlights/index.html.

Figure 3.1: Elements of a National Spectrum Policy

Source: Bob Horton.

An important part of implementing any spectrum plan is ensuring that licensing can take place in a timely way, while ensuring that frequencies are put to their most efficient and highest-valued use over the longer term. To meet these objectives, policy-makers and regulators have begun to develop market-based policies (e.g., auctions, flexible use, in-band migration, spectrum sharing and spectrum trading) to supplement or even supplant slow, bureaucratic processes. In addition, regulators have developed a variety of approaches to ensure that services are widely deployed, spectrum is efficiently used and competition is encouraged.

The enormous changes occurring in mobile broadband and the accompanying evolution of spectrum policy are international in scope. It is therefore critical for governments to set their domestic spectrum policies and plans in the appropriate international and regional context, to the greatest extent possible. Harmonization is critical. At the international level, the ITU provides a common venue where all Member States can participate in the work of allocating spectrum for new uses and developing standards and plans that maximize the harmonized use of the spectrum resource. As the top level of the spectrum allocation process, the ITU thus plays a critical role in promoting harmonization among the regions of the world—ensuring that services can coexist with each other, while minimizing interference.

Engagement at the regional level is also critical for ensuring that spectrum is most efficiently utilized. Regional organizations are important venues for developing policies that will promote harmonization among neighboring countries. In addition, regional preparations for the WRC and RA Meetings provide a convenient way for many countries to stay abreast of developments in efficient use of spectrum. A series of preparatory meetings hosted by regional bodies also allows neighboring countries the opportunity to dialogue on border issues and to share similar experiences and promote harmonization. These opportunities also create a context for the ongoing refreshment of the National Spectrum Plan and associated forecasts.

4

INTERNATIONAL MOBILE ROAMING SERVICES: A REVIEW OF BEST PRACTICE POLICIES

The growth of mobile communications has been one of the most significant ICT trends in the last two decades. This growth, however, coupled with increases in cross-border and international travel, has highlighted an important transnational policy and regulatory problem: the high prices charged for international mobile roaming services. The analyses and reviews of international mobile roaming that have been undertaken by all international organizations, regional bodies and individual countries have reached a similar conclusion. That is, that retail prices for international mobile roaming are significantly high, have no linkage to domestic mobile prices and do not reflect costs. In addition, there is widespread agreement that a major reason for high retail prices are the underlying wholesale prices, which come under the responsibility of regulatory authorities in visited countries, and that lowering wholesale rates may not in itself be sufficient to lower retail rates, since market forces and competition are weak in the international roaming market.

Finding solutions to reduce high mobile roaming prices has been difficult for a number of reasons. First, users in a country usually choose their service provider on the basis of the best prepaid offer or post-paid monthly mobile subscription package available for their particular consumption requirements - international mobile roaming charges are not normally advertised as part of this package. Second, even if users are aware of the prices charged by mobile service providers for international roaming, roaming is not a major consideration for them since in volume terms domestic calling, messaging and domestic mobile broadband access constitute the bulk of their mobile activity. Third, when travelling, a mobile user cannot usually choose his/her international roaming service provider; having to rely instead on the roaming agreements set up between their national provider and service providers in other countries. Finally, authorities from the country of origin of international travellers have no authority to control and regulate the prices set for international mobile roaming in a visited country. Empowering consumers by increasing transparency can help with the first two issues, while transnational cooperation between governments and providers can help address the last two.

Policy-makers and regulators have been attempting to reduce rates in a variety of ways. First, there has been a great focus on reducing the rates directly, at the wholesale and retail levels and through taxation and interconnection policies. Given that the main cost components which affect mobile roaming prices is the wholesale rate, the longer term solution is to find ways to reduce this rate while ensuring that reductions in wholesale rates are passed on to the retail market. Second, however, it is also important to ensure that consumers are well-informed and to promote greater transparency as to what the rates and terms and conditions for roaming are. While initiatives that increase transparency for consumers may only have a small and longer term impact on lowering IMRS rates, such measures can help protect consumers from "bill shock" and may provide the information and incentive for users to try alternatives when roaming internationally. Third, in the long term, solutions to high international mobile roaming charges must create conditions of

effective competition. The introduction of new technologies, such as VoIP, could result in structural changes in the IMRS market to foster competition, but may require enabling policies or changes to laws and/or regulations to allow their use by subscribers.

Proactive policy and regulatory changes are the only sure course of action to ensure that structural changes take place in the IMRS market, but these need to be co-ordinated at the bilateral or regional level, but preferably at the international level. As discussed in this Chapter, several structural measures can be used, many of which are mutually compatible and complementary.

Progress in resolving the high prices paid for roaming will only occur through appropriate bilateral, regional and/or international agreements. While the initial steps that are being taken in some of the bilateral and regional agreements are useful in lowering prices for users, they will be insufficient to result in longer term competition in the global market—competition that can be sustained without intrusive regulation. The EU Regulation III with its structural measures is moving toward a framework that will help such competition emerge. The WTO has also taken an initial step in informally discussing international mobile roaming. Bilateral agreements and regional agreements should be encouraged but should be opened to other countries if they are willing, and able, to make the same commitments as the original signatories. The ITU can play an important role in developing and diffusing best practice regulation for IMRS among its members, and in particular acting as a forum to exchange experiences based on the lessons learned by those countries that have already moved forward and taken action to lower prices and develop competition in IMR markets.

5 **BLURRING BOUNDARIES: GLOBAL AND REGIONAL IP INTERCONNECTION**

The Internet has been perhaps the most influential economic and social event of our time. Its growth has been fueled by expanding networks, greater uptake and greater use of more advanced services. As a result, from 1994 to 2010, the average annual growth in Internet traffic was about 140 per cent per year. Over the last five years of that period (1996-2010) traffic grew eightfold, or an average of about 50 per cent per year.⁷ This growth has been made possible by many factors, including the development of an efficient global market for connectivity through commercial agreements for the exchange of IP traffic. The model of peering and transit is now so well understood that the vast majority of peering agreements can be concluded on a handshake basis, without the need for a written document.

Today, global traffic continues to increase, but what that traffic consists of is changing. For most of the history of communications, voice has been the primary offering, accounting for most of the world's traffic and the majority of the revenue of the world's operators. Today, although voice still is important from a revenue perspective, it represents only a small portion of the traffic carried on global networks. Video—particularly streaming and downloaded video—now represents the vast majority of the traffic carried on the world's networks. The emergence of cloud services has also begun to drive added traffic as more businesses take up cloud-based services. The trend to video and cloud services (and interactive gaming and video conferencing, etc.) has in turn driven a demand for higher quality services; where the quest to reduce latency is pursued in all parts of the Internet ecosystem.

The growth and changing traffic mix of the Internet have forced the Internet ecosystem to adapt. The transnational Internet connectivity market has responded by adding investment in Internet eXchange Points (IXPs), CDNs and long-haul facilities—all of which help to improve service quality and reduce costs and prices. IXPs in particular have played a key role in the growth of the Internet. The establishment of an IXP in-country or in-region can become part of a virtuous circle of investment in Internet assets by encouraging further investment in backbone and local access networks, IT-related businesses, and domestically-produced content.

Over the last decade, a new category of service provider has developed on the Internet – the content delivery network, or CDN. The purpose of a CDN is to deliver content directly to the terminating access network, thus covering what has been a significant cost for networks in developing countries. A CDN also enhances quality through more direct routing and the caching of content close to the recipient of the content, which reduces latency and transport costs. Like the growth in peering, CDNs have changed the topology of the Internet, flattening its structure, providing more direct delivery of traffic, and further disintermediating the providers of transit.

⁷ Weller, Dennis and Bill Woodcock. IP Traffic Exchange - Market Developments and Policy Challenges, OECD DSTI/ICCP/CISP(2011)2/Final forthcoming October 2012 at page 5. See also the Annex to this paper DSTI/ICCP/CISP (2011)2/ANN/FINAL.

Finally, the growth of the Internet has been greatly helped in recent years by the deployment of additional long-haul international backbones, many of which are undersea cables.

The combination of shifting demand for services by consumers and businesses, as well as dramatic changes in the structure of the Internet itself, has created both opportunities and challenges for market participants. Companies up and down the value chain are re-evaluating their business models and seeking to adapt. Both wireline and wireless broadband access providers, for example, are struggling to increase capacity in response to increasingly bandwidth-hungry applications, and are changing their rate structures to more closely reflect how their networks are being used. Content creators and media companies are exploring ways to gain from the new avenues of distribution the Internet offers, while maintaining defensive strategies to preserve the revenues they get today from established delivery channels, such as linear television. Perhaps not surprisingly, disputes have arisen over who should pay what to whom. More often than not, it appears that the outcome of such disputes is that the CDN has been able to peer with the local access network on a settlement-free basis.⁸ In this way the market appears to be addressing many of the concerns raised in the net neutrality debate, such as the terms on which a content provider could deliver traffic to an access network, whether there would be a charge on the “other side” of the market, and how the physical costs of the interconnection arrangements would be divided between the parties.

Looking ahead, policy-makers and regulators face several challenges in addressing transnational interconnection issues. For example, the development of Internet resources and opportunities has varied significantly by region and by country.⁹ Developing countries in particular face challenges in promoting growth of Internet assets that will support the widespread availability and adoption of broadband. These differences are based in part on geography, distance, and scale, but are also highly sensitive to competitive conditions within each country and to related choices by governments with respect to liberalization. These factors, rather than any market failure in global markets for IP connectivity, have played the major roles in determining the success of Internet development in emerging markets.

⁸ Labovitz (2012) for example reports that CDNs are “now (nearly) completely peered.”

⁹ A review of market developments by region and country is provided in Weller and Woodcock (2012)

6 DEMYSTIFYING REGULATION IN THE CLOUD: OPPORTUNITIES AND CHALLENGES FOR CLOUD COMPUTING

With the emergence of ubiquitous broadband connectivity, cloud computing offers an alternative platform from which Information and Communications Technologies (ICT) providers can offer powerful and innovative new services, while providing users with the opportunity to gain access to computational resources and applications beyond those traditionally feasible. As an emerging technology/service, the definition of cloud computing is still in flux. Similarly there are a number of ways in which cloud services are deployed and used, as seen in Box 6. 1.

Box 6.1: Cloud deployment models

Private cloud: The cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise.

Community cloud: The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be managed by the organizations or a third party and may exist on premise or off premise.

Public cloud: The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services.

Hybrid cloud: The cloud infrastructure is a composition of two or more clouds using different deployment models (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds).

Cloud services are most commonly categorized into three groups:

- Software as a Service (SaaS), such as Google Docs and Microsoft's Office365; social networking, such as Facebook and MySpace; and the delivery of 'over the top' (OTT) content, such as video-on-demand.
- Platform as a Service (PaaS) is typically targeted at developers, enabling collaborative application development, such as open source software communities.
- Infrastructure as a Service (IaaS) generally involves the provision of virtual machines, offering processing and storage capacity, such as Amazon's 'Elastic Compute Cloud'.¹⁰

The cloud computing market also comprises layers of different technologies, often supplied by diverse companies within the supply chain (e.g. Apple's iCloud SaaS is hosted on Amazon's IaaS).

¹⁰

<http://aws.amazon.com/ec2/>

Similarly, cloud users depend on various service providers for their use of whichever cloud model they choose, including cloud service providers (CSP), who have a direct contractual relationship with the subscriber to the service; cloud infrastructure providers (CIP), who provide the cloud service provider with infrastructure, such as server farms and processing; and communication service providers, who provide the transmission service enabling the cloud user to communicate with the cloud service provider.

Although cloud computing can provide end users with several benefits, such as reduced ICT labour costs, energy savings, smaller equipment space requirements and fewer or no licensing requirements, several challenges exist to the greater uptake of cloud solutions. Many of these flow from the fact that a company's data is no longer stored on its property and may in fact exist in an entirely different country and involves issues of data security, legal questions (which country's laws apply), and being able to access information and services as needed.

Given the benefits of cloud, governments have an inevitable interest in both facilitating its adoption in the economy. Legislative and regulatory intervention in markets can be designed both to constrain harmful behaviours as well as facilitate beneficial behaviours. Policy-makers and regulators will thus find themselves addressing a number of unique problems associated with cloud computing. As an initial matter, the regulatory characterization and treatment of cloud computing may itself deter its take-up until regulators clarify the situation. Are cloud services a telecommunications service or an information service; and who should regulate them? Competition authorities are also likely to play a key role in guiding the cloud by addressing issues such as contractual arrangements between supplier and customer, anti-competitive "lock-in," and even government procurement practices. Similarly, consumer protection authorities have already had to intervene to stop fraudulent advertising practices, resolve contract disputes, and issues arising from a customer's inability to port its data to another cloud provider. Such sectoral regulation may then have to operate in conjunction and cooperation with horizontal national regulators, such as a data protection authority, in respect of certain issues.

7 THE CLOUD: DATA PROTECTION AND PRIVACY WHOSE CLOUD IS IT ANYWAY?

Cloud computing has been recognised as a technology “game changer.”¹¹ It offers a range of benefits for users, businesses and governments alike. However, there is a significant tension between the financial and efficiency benefits cloud services offer and the risks such services may pose to an individual’s privacy or personal data. The challenge is to balance the interests of stakeholders, policy-makers, businesses, and consumers to arrive at a pragmatic approach to regulation that is consistent, clear and proportionate. It must also acknowledge the transnational, not geographically confined, nature of the Internet, as well as the pace of technological change. Against a background of increasing concern about privacy issues in general over the last decades, 89 countries have adopted privacy or data protection laws.¹² When many of these laws and accompanying rules, were adopted, however, the Internet had not yet emerged. Protecting privacy by restricting the geographic movement of personal information was possible, and thus, a critical element of many of these laws is how they regulate international data flows as a mechanism for protecting individual privacy and enforcing national policies. Since that time, however, business, the economy and technology have fundamentally changed; the Internet is an inherently international “network of networks.”

Today, privacy and data protection measures are spreading quickly throughout the world as policymakers and regulators seek to respond to growing privacy and data protection concerns. Figure 7.1 provides an indication of where data protection laws are in place or in the legislative process.

¹¹ The power of Cloud: Driving business model innovation, IBM Global Business Services by Saul Berman, Lynn Kesterson-Townes, Anthony Marshall and Robini Srivathsa.

¹² Global Data Privacy Laws: 89 Countries, and Accelerating; Social Science Research Network; 6 February 2012.

Figure 7.1: Selected Privacy and Data Protection laws around the World

Source: PLC : General Counsel briefing: privacy & data protection as at 23 February 2011.

Despite the wide recognition of the importance of privacy issues, different countries and regions have approached the issues in different ways and are more or less advanced. In Europe, for example, the fundamental principle of privacy in the European Union (EU) is set out in Article 8 of the European Convention on Human Rights, and specific laws are contained in the e-Privacy Directive, which has a particular focus on the protection of personal data, and the “European Direct” Directive, which applies to the collection and processing of personal data. In 2012 a new Regulation was proposed to replace the existing Directive. Additionally, different countries in Europe also have their own privacy and data protection regulations, the diversity of which has led to difficulties in the transnational cloud context. Similarly, the United States has laws (the Patriot Act) governing sharing of personal information generally and sector-specific privacy laws (financial and health care, for example), but individual states also have laws that regulate privacy, often through consumer protection rules. Canada has a federal law governing privacy, as well as a privacy commissioner; however, its laws do not restrict cross-border data flows as does the EU Directive. Many countries, although they do not have overarching privacy or data protection legislation, such as Brazil, South Africa or the United Arab Emirates, do recognize privacy in their Constitutions, and they and other countries such as India, Japan and Saudi Arabia, for example, often have specific laws for consumer protection, telecommunications, cybersecurity or information technology that contain specific privacy and/or data protection provisions.

Given the wide variety of approaches to privacy around the world, the question arises: is the current patchwork of regulation fit for purpose in the cloud? The short answer is no. National

regulation with respect to privacy and data protection was introduced 20 to 30 years ago. More importantly, cloud services, whether provided to individuals through social networking or webmail or to businesses of any size or governments, are by their nature global, and technology is moving quickly towards further international expansion. To restrict international data flows in the interest of protecting privacy rights is no longer an effective or efficient tool in this context. Rather, the effect is to slow down the growth of cloud services when it should be a major source of economic growth. Policy-makers and regulators need to address this problem by establishing frameworks which are cloud-aware and provide efficient, clear and proportionate protections. They further need to look to the future and particularly the fundamental role and importance of transnational co-operation. Some steps have been taken at the regional and global level to create more consistent policies for privacy and data protection in the cloud, including the Madrid Resolution, efforts to establish a European Cloud Partnership, and in international groups including the ITU and the International Chamber of Commerce. These steps are welcome, as the lack of consistent and coherent domestic and international policies and regulation is having a chilling effect on the uptake of global cloud services. Policy makers, regulators and commercial stakeholders need to work together to develop standards, working practices, new technologies and educational tools that are “fit for purpose” in the changing global environment, taking particular note of the special needs of developing countries to balance the need to continue to build infrastructure, while developing adequate legal and institutional frameworks and safeguards to protect privacy and data (where no laws may exist at all). Industry has also responded to the challenges of today’s cloud privacy climate. More analysis is provided in the Chapter.

8 CONCLUSION

There is little question that the world is becoming more interconnected. The development of networks – and the services that run over them – has become a high priority in many countries as their importance for achieving economic and social objectives has been recognized. As a result, advanced broadband networks are being deployed around the world at an increasing pace. As networks spread and as services increasingly cross national borders, however, a number of challenges are increasingly confronting policy-makers and regulators. The new networks are breaking down the traditional categories of regulation and causing policy-makers to rethink their legal and regulatory frameworks. The advent of new services are also raising basic questions about how such services should be regulated; can old models be applied or is a new approach needed?

In the growing network environment, however, while a progressive policy framework to govern the physical infrastructure is necessary, it is not sufficient. Networks are ultimately set up to deliver services. Policy-makers and regulators will also have to face the challenges that these new services and applications bring. The chapters that comprise this *Trends* report highlight some of the issues that will have to be addressed and provide recommendations and suggested best practices that can help policy-makers and regulators as they seek to meet these challenges in our increasingly interconnected world.

¹ Text and statistics in this paragraph and the following three are adapted from ITU Statistics (<http://www.itu.int/ict/statistics>) and the ITU Measuring the Information Society Report 2012, <http://www.itu.int/ITU-D/ict/publications/idi/index.html>.

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